

violent motion lasted about three quarters of an hour, and then the waters fell to their usual height at that time of the tide, and have continued to flow and ebb ever since without any perceivable alteration. I am,

Reverend Sir,

Dartmouth, April 30,
1756.

Your most obedient servant,

Henry Holdsworth.

It appears by this account, that the agitation of the waters observed at Ilfarcombe, on the 27th of February last, was not perceived on the southern coast of Devonshire.

XCVIII. *An Account of a Method of observing the wonderful Configurations of the smallest shining Particles of Snow, with several Figures of them : By John Nettis, Doctor of Physic, and Oculist to the Republic of Middleburg, &c. Translated from the Latin.*

Read May 13, 1756. **I** Had a mind to examine what kind of figured particles icy concretions consisted of. I found an icy star of six rays, with long striæ joined to them on every side, (which having, together with the rays, angles of sixty degrees, were wonderfully adorned on both sides with other long particles) in the midst of a large vessel of rain water :

water: but my endeavours were frustrated by the water, which adhering to the little star, as I took it up, was instantly frozen, and turned its figure, that was so exactly formed, to a crust.

And, as by comparing the icy stars, in the surface of the standing water, with those of snow, it seemed to me very likely, that the minute parts of ice had the same external configurations with those of snow, when the air was coldest, I prepared in the year 1740, to make the most minute observations, and the most exact drawings in my power of the most perfect figures of snow, which were not very irregular, the weather being then very favourable for the purpose.

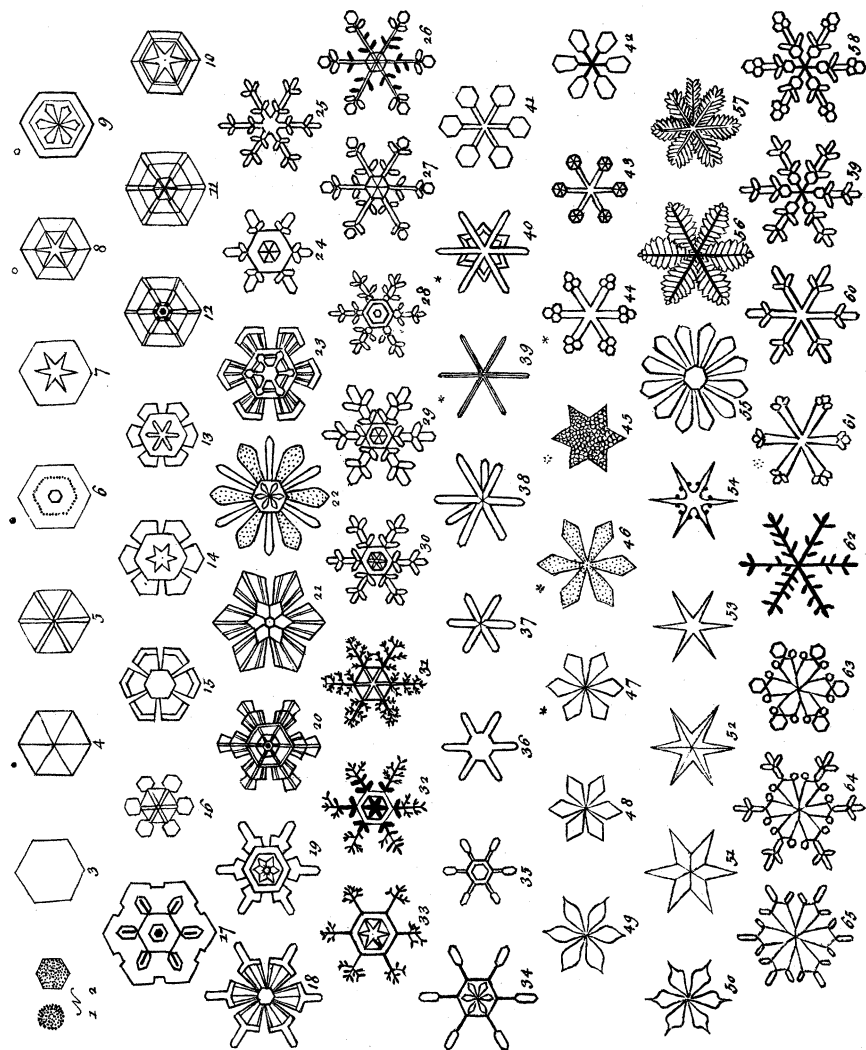
I first made use of double convex glass lenses of about an inch focus; then I used a compound microscope consisting of an object, and an eye glass, or two eye glasses, invented and carried to England by Corn. Drebellius, an ingenious philosopher, as Huygens, in his *Dioptrics*, and others assert; and brought to greater perfection by the industrious English, by the addition of a concave speculum, placed under the object glass, in order to reflect a better light, and render the object more conspicuous.

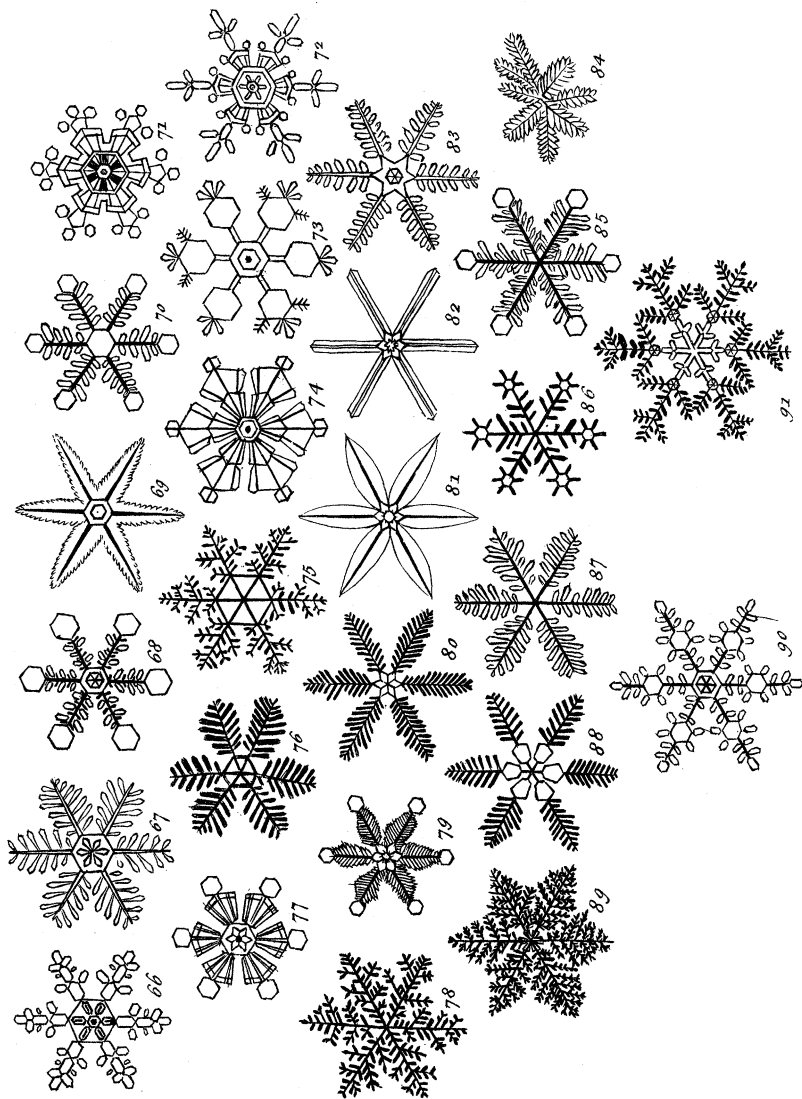
The weather being intensely cold, the snow, which fell, was hard, intire, and pellucid, and some particles being received upon a pencil, were placed upon a plane glass plate under the object glass: the greatest care was taken, that the smallest particles might not be dissolved, either by the breath, or perspiration of the hands, lest the little angles might, by the least degree of warmth, disappear. And thus, with this apparatus and these precautions, the extreme ex-

actness and equality of the figures of their most minute particles might be observed and delineated.

Some consisted of long round spiculæ ; others approached to a round figure made up of small globules ; but these were observed to be opaque, as the air was disposed to thaw ; but when the air was frosty, many slender hexangular figures appeared, some of equal, others of unequal sides ; such as are exhibited by Scheuchzer in his *Herbarium diluvianum*, and by Swedenburg in his *Prodromus principiorum*, p. 21 ; and such as I have seen in a pitcher, which was covered, in which the water was frozen ; and such figures of the concretions of vitriol, salts, &c. as may be seen in the works of Leewenhoeck, whom I find to be the most faithful and expert in delineating and describing the minutest natural bodies ; and also such as are published by Capellar in his *Prodromus Crystallographiæ*.

Several little stars seemed to me to consist of six oblong, round, hexangular lamellæ, or indeed of six rays terminating in points ; which little stars appeared to be formed of six plane rhomboidal particles. Several plane hexangular particles of equal sides, or oblong hexangulars, adhered to several of these stars, either at their extremities, or at each side of every ray. Some hexangular lamellæ of equal sides were adorned all round with six other lamellæ of the same figure and size, or with hexangular oblong lamellæ, and to these sometimes there adhered several others more or less. Many of these hexangulars were ornamented with six rays, and to these were fixed the most slender lamellæ, which were also hexangular, of equal or unequal sides ; but of equal angles of sixty
5
degrees ;





degrees ; and to these lamellæ others like them adhered, some greater and some less, but most of the latter ; and others various like the fortifications of cities appeared to be joined to long hexangular spiculæ, and plane hexangles of equal sides.

In one day and night I found fifteen, twenty or more particles of snow differently formed ; such as Olaus Magnus mentions ; and in the year 1740, on the 11th, 12th, 13th, 21st, and 23d of January, and also on the 6th, 23d, and 24th of February, I had an opportunity of delineating eighty different admirable figures of snow, and of observing their numberless varieties.

And although a vast variety of these configurations of snow may fail or vanish in the same moment, yet the smaller particles, from their various combination with one another, constituting this wonderful variety of configurations of the snow, were observed by me to be comprehended under these following forms, viz. of parallelograms, or oblong, strait, or oblique quadrangles, rhombs, rhomboids, trapezia, or of hexangular forms of equal or unequal sides, whose angles are sixty degrees ; and these hexangular particles were far more numerous than those of any other form mentioned.

The natural size of most of the shining quadrangular particles, and of the little stars of snow, as well the simple as the less compound ones, does not exceed the twentieth part of an inch : nor do the more compound particles the fifth of an inch. For the natural magnitude or rather smallness, see fig. 4. 6. 8. 9. 10. 35. 37. 39. 40. 44. to 47. and 61.

These beautiful various configurations to the number of 91, are in Tab. xx. and xxi.

N. B. Number 57 and 84, are anomalous figures of snow; of which there is an infinite variety, that may be observed.

XCIX. *An Account of the Copper-springs lately discovered in Pennsylvania: By John Rutty, M. D. of Dublin. Communicated by Mr. Peter Collinson, F. R. S.*

Read May 20, 1756. **I**N the province of Pennsylvania is a copper-mine, which affords a spring, that appears to have the same qualities as that Irish water, lately described by Dr. William Henry and Dr. Bond in the 47th and 48th volumes of the *Philosophical Transactions*, but is much sharper, for it will dissolve iron in a quarter part of the time; and we are assured, by the accounts transmitted from the proprietors of it of the trials they have made, that it yields the same copper-mud or dust as our Cronebaun-water, of the county of Wicklow, in this kingdom (being the water above mentioned) which being collected from bars of iron immersed in it, for the purpose of extracting the copper from the Pennsylvania water, it produced above half pure copper on being melted in a crucible; an experiment, that requires to be repeated, in order to ascertain the proportion of copper contained with accuracy; our copper-spring of the county of Wicklow yielding a proportion considerably larger than this, viz. 16 parts of copper out of 20 of the mud.

In the neighbourhood is a great abundance of the ores of vitriol and sulphur, and the spring comes thro'